Physics 270, Spring 2025

Sections 0401-0405

Instructor	Email	Office	Phone	Office Hours	Zoom
Professor: Drew Baden	drew@umd.edu web site	3208D PSC	56069	Fri 1-3pm or by appt	zoom
TA: Vennela Vuruputuri	vennela@umd.edu	PHYS 0104	(use email)	Tue and Thur, 4-5pm	zoom
TA: Harry Chaflin	hchaflin@umd.edu	PHYS 2221	(use email)	Mon 11am-12pm, Wed 2-2:30pm	zoom
TA: Christopher Zapata	chriszap@umd.edu	PHYS 1214	55984 (prefers email)	Tue and Thu, 7-8pm	zoom
TA: Liam Hodgson	lhodgson@umd.edu	PHYS1214	(use email)	Wed 3-4pm	zoom

Lecture: MW 4-5:15pm 1412 Toll Physics (PHY1412)

Discussion sections:

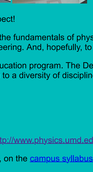
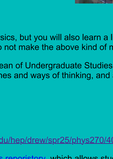
Section	Time	Room	
0401	M 5:30-6:20pm	PHY 1204	Liam Hodgson
0402	W 5:30-6:20pm	PHY 1204	Vennela Vuruputuri
0403	Th 6-6:50pm	PHY 1204	Christopher Zapata
0404	W 6-6:50pm	PHY 1219	Harry Chaflin
0405	Tu 6-6:50pm	PHY 1219	Christopher Zapata

SPS Tutoring: Mon-Thurs 4-6pm, PHY1303 (Toll Physics)

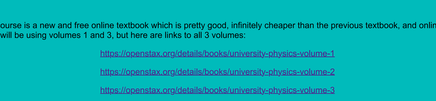
Course Description

This is the 3rd semester of a 3-semester sequence of calculus-based general physics for engineering students. I believe you have to master this material to go on in your engineering career. We will study electrodynamics, optics, special relativity, and some introductions to quantum mechanics.

But maybe this course is more than just fulfilling requirements! As we know, the importance of good engineering in modern life cannot be overstated, and good engineering vs bad engineering (bad means mistakes!) can make a huge difference in all of our lives. Mistakes will happen, but it will be your job to guard against it. For instance, mistakes like these:

can cost lives and waste huge amounts of money. And, mistakes like these:



can not only cost you your job, but also your self respect!

So hopefully you will not only learn something about the fundamentals of physics, but you will also learn a little about how think like a scientist/engineer, which I know will help you have a successful career in engineering. And, hopefully, to not make the above kind of mistakes!

Note that this class contributes to UMD's General Education program. The Dean of Undergraduate Studies says "General Education offers students foundational learning experiences and exposes them to a diversity of disciplines and ways of thinking, and are intended to build competence, expand your understanding of the world, and foster creativity."

Syllabus

This syllabus is available online with a browser at

http://www.physics.umd.edu/hep/drew/scr25/phys270/400

I will also try to put this syllabus, or a pdf version of it, on the campus syllabus repository, which allows students to access it on Testudo, if that's still available. Although sometimes that site doesn't work. Sigh...

Anyway, it will also be available on ELMS.

Textbook

The textbook for this course is a new and free online textbook which is pretty good, infinitely cheaper than the previous textbook, and online so you don't have to carry it around. We will be using volumes 1 and 3, but here are links to all 3 volumes:

https://openstax.org/details/books/university-physics-volume-1

https://openstax.org/details/books/university-physics-volume-2

https://openstax.org/details/books/university-physics-volume-3

ELMS Material

I've uploaded to ELMS the pdf version of the notes I will be following in the lectures. These are all in the "files" tab, and have the form "Vol 1 Ch 16 Waves.pdf". You can use these any way you see fit. My suggestion is that you read them before the lectures. How you use them will be up to you, they are intended to be a resource for you. One possibility is to print them out and take them to the lecture and annotate mine so that you don't have to spend the entire lecture scribbling. On the other hand, it's also true that taking your own notes is a good way to learn.

There are also some pdf versions of powerpoint that I've collected over the years that I will try to show. These have the form "Slides - Waves.pdf". I've added or changed several of the slides here and there, just to make it clearer.

Homework

Homework problems will be assigned throughout the term, using an electronic format called ExpertTA. You should do the homework before the due date, because after that the web site will close the assignment and you will not be able to turn it in even if it's late without some kind of penalty. Access will be via ELMS. Log in with your UMD Directory ID. If you are registered for the course, you will see the course after login. Click on the course.

Note that ELMS (Canvas) uses some default email address that it assigns or gets from you. You should check the ELMS default setting to be sure that they have the right one, *before* you do anything on ELMS! Be careful here, for some ELMS defaults you might have a umd.edu email, for others a terpmail, etc. so this can get confusing unless you set things explicitly.

Once you are in the class in ELMS, click on Assignments and you will see the homework. I will add homework as we get into the chapter, but there is one already called "Intro to ExpertTA". Clicking on that first homework in ELMS will take you to the payment pages for ExpertTA. It should cost $32.50 to you. If you have any problems, contact ExpertTA support. After payment you will see the actual homework, note you only have to pay the first time. We recommend you register as soon as possible before the first day of class and do the "Learning ExpertTA" assignment, which is there to help you get familiar with ExpertTA. Full solutions for the homework assignments will be discussed at the discussion session with the TA, and I will post the solutions on ELMS in the files tab.

Homework is how you train your mind. You are encouraged to work in any size group you feel comfortable with. But my advice is to not do the homework as a group, because I grade on a curve, but mostly because homework is like practice, and *you* have to be the one to puzzle through things, not just enter what the group decides to enter. Note that I've seen a very strong correlation between doing the homework regularly (and not falling behind) and getting a good grade.

Lectures

Lectures are intended to help you with acquiring a basic understanding of the material. I will go over the relevant chapters, with an emphasis on demonstrations and problem solving, and how things work. My advice is to attend all the lectures and not fall behind, as this is a very fast paced course and one of the most important tactics to employ to get a good grade is to keep up with the material, do the work, and not fall behind.

Also, note that I may use the lectures to make announcements, and if I do I will try to also send around an email.

Discussion Sections

You will also have a discussion session each week, except at the beginning of the semester. The discussion session is designed to help you with your understanding of the material. My advice is to prepare in advance at least one question from the homework or the book that you are not sure about, and ask your TA to go over it. One piece of advice: don't go to the discussion and ask the TA to solve the problem, instead go and ask the TA to teach YOU how to solve the problem. There's a difference! After all, you don't learn to shoot jump shots in basketball by watching your TA do it!

Exams

We will have 3 "midterm" in-class exams, and a final. The midterms will cover 2-4 chapters, and the final will be comprehensive.

The following schedule is tentative for the midterms and the final but it might change depending on how the class goes and other circumstances, etc.

Midterm 1:	Mon, Feb 24, Volume 1 Chapters 16/17 & Volume 3 Chapter 1
Midterm 2:	Mon, Mar 31, Volume 3 Chapters 2/3/4
Midterm 3:	Mon, May 5, Volume 3 Chapters 5/6
Final:	Th May 15 6:30-8:30 room TBD by campus sometime mid semester

Midterm exams

The dates for the midterms are subject to change based on how well we are doing getting through the material, the weather, bomb threats, fire, etc. But for the most part you can pretty much count on those dates in the above table.

On exam day, bring a pocket calculator and writing tools (pens or pencils). You are not allowed to use your mobile device during the exam (we have to make a level playing field, which means no one can have the advantage of using google!), so be sure to bring a separate calculator (**not** the one on your smart phone!).

All exams are closed-book and closed-notes. However, you should prepare and bring a formula sheet (both sides are ok for formula) containing equations and values of fundamental constants, but EMPHATICALLY NO PROBLEM SOLUTIONS. The exam proctors may ask to take a look at your formula sheet, and if there are any problem solutions there, they may make you take the exam without it!

When the exams are handed back, I will post a distribution on ELMS (or somewhere if ELMS won't let me, I'll let you know) so that you can get an idea of how well you did relative to the class as a whole.

Note: *only 2 of the mid term exams will be used in calculating your final grade for the course.*

I do this because in the complicated modern life, sometimes you will have to miss exams for all sorts of reasons (illness, family, legal, completely overloaded, etc). I have found that make-up exams are inherently unfair to the person who takes them (they are usually harder than the scheduled exam). So, to make things simpler, I will drop the lowest of the 3 midterm grades when making up your final grade. FYI, to do this, at the end of the semester I will normalize all 3 exams to have the same mean and standard deviation, and will use the two exams that have the best score relative to the mean and standard deviation for your grade, dropping the exam with the lowest score. This means that if you have to miss an exam, then I will drop that exam from your grade.

Note that if you miss the final, however, you will receive an incomplete (I) for the course provided that you have a passing grade up to that point.

Final exam

The final exam will be comprehensive. The date for the final exam is set by campus and will definitely be held at the noted time and date, however the campus final exam schedule has not yet been made official, so you should check here periodically (they say "mid semester). We will announce the location when the campus tells me.

Course Grade

Your final score will be based on your overall score for Homework, Midterms, and Final, using the following weights:

Homework	20%
2 Midterm exams	50%
Final exam	30%

As stated above, I will drop the lowest of the 3 midterm exam scores. The final letter grade will be based on the distribution of final scores for the entire class (this is called "curving"). That is, this is not one of those courses where you know what letter grade you get from the scores of each exam etc, you will have to wait.

Course Schedule:

Below is a preliminary schedule for what I will try to cover. However, given that life is full of fluctuations, and that we should all be flexible, I may make adjustments along the way. I will try to stick with the exam dates below, but as the semester progresses, we may have to make changes. If we do, I will discuss them with you beforehand.

PHYS 270 Spring 2025, MW 4:00-5:15, Toll Physics 1412 (PHY1412)

	Monday		Wednesday	
January	27	Introduction + **Volume 1** Ch 16 Waves	29	Ch 16 Waves
February	3	Ch 16 Waves	5	Ch 17 Sound
	10	Ch 17 Sound	12	**Volume 3**Ch 1 Light
	17	Ch 1 Light	19	Ch 2 Optics
	24	Exam 1: Waves, Sound, Light	26	Ch 2 Optics
March	3	Ch 2 Optics	5	Ch 3 Interference
	10	Ch 3 Interference	12	Ch 3 Interference
		Spring Break (March 16-23)		
	24	Ch 4 Diffraction	26	Ch 4 Diffraction
	31	Exam 2: Optics, Interference, Diffraction		
April			2	Ch 5 Relativity
	7	Ch 5 Relativity	9	Ch 5 Relativity
	14	Ch 5 Relativity	16	Ch 6 Photons
	21	Ch 6	23	Ch 6 Photons
	28	Ch 6 Photons	30	Ch 7 QM
May	5	Exam 3: Relativity, Photons	7	Ch 7 QM
	12	Ch 7 QM		

Final Exam Thursday May 15 6:30-8:30pm Room TBD

Campus Calendar

Campus maintains a calendar, and they are pretty serious about it. You might want to be sure you are familiar with it. Just click on the previous link.

Honor Code

It goes without saying that you are on your honor to play fair and not cheat. And as future engineers, you will find that cheating never works, and people who cheat end up falling behind one way or another eventually. Especially in engineering! Anyway I don't expect any of you will be dishonest, but I have to pass along the following:

The University of Maryland has a nationally recognized Code of Academic Integrity, administered by the Student Honor Council. This Code sets standards for academic integrity at Maryland for all undergraduate and graduate students. As a student, you are responsible for upholding these standards for this course. It is very important for you to be aware of the consequences of cheating, fabrication, facilitating academic dishonesty, and plagiarism. Violations will be taken very seriously and may result in an XF grade for the course and possible suspension. For more information on the Code of Academic Integrity or the Student Honor Council, please visit http://www.shc.umd.edu/.

Collaboration

Working together with other students is part of the course; in fact, the tutorials and labs are specifically designed around teamwork. Working together to figure out the homework is also encouraged, but you must turn in your own work. Talking about how to work the problem is fine if it helps you to understand it better, but COPYING A SOLUTION IS STRICTLY FORBIDDEN. IF CAUGHT ENGAGING IN SUCH ACTIVITIES, YOU MAY BE REFERRED TO THE STUDENT HONOR COUNCIL.

Religious observances

If you need to miss class, a deadline, or an exam due to a religious observance, please notify me in advance, preferably at the beginning of the semester.

Students with disabilities and/or special needs

Accommodations will be provided to enable students with documented disabilities to participate fully in the course. Please discuss any needs with me at the beginning of the semester so that appropriate arrangements can be made. Students who are registered with DSS, and who are planning to take examinations at DSS facilities, are required to let me have the pertinent authorization forms in editable electronic format at least one week prior to each exam date.

Weather and emergency closures

If the University is closed due to inclement weather or some emergency situation on the scheduled date of an exam, then the exam will be given during the next class period when the University is open. If the University is closed on any non-exam day, including just before an exam, then the exam will still be given according to the original schedule. In these or other exceptional circumstances, I will attempt to send out information by email.

Course announcements by email and email usage

I will be sending important announcements to the class, specifically to each student's umd.edu email address, as reported to me by the UMEG system, which gets your email from when you logged into Testudo (or from terpmail if you did not specify it with Testudo). If you use some other email system, please make sure that mail sent to your umd.edu address is successfully forwarded to the address you use most regularly. If you have a question, and you can't get to the TA or to my office hour, then you can send it to me via email. I will respond as soon as I can.

Copyright Protection of Course Materials

Unless indicated otherwise, any lecture handouts, exams, homework and exam solutions, and the lectures themselves (including audio and video recordings) are copyrighted by me and may not be distributed or reproduced for anything other than your personal use without my written permission. (The University makes me say this!)